TITLE OF THE COURSE: ENGINEERING MATHEMATICS-III
B.E., III Semester, Civil Engineering

[As per Choice Based Credit System (CBCS) scheme]

Subject Code: 18 MAT31	**CIE:** 50
Number of Lecture Hours/Week: 04	**SEE:** 50
Total Number of Lecture Hours: 50	**Exam Hours:** 03

CREDITS – 04

Course Learning Objectives:
This course will enable students to:
- Introduce most commonly used analytical and numerical methods in the different engineering fields.
- Learn Laplace transform and Z-transforms, statistical methods, numerical methods.
- Solve the problem on Interpolation.
- To discuss the random variable and associated probability distributions.

Modules	HRS
Module -1 **LAPLACE TRANSFORMS :** Definition, Laplace transforms of Elementary functions, properties(without proof) periodic function, Unit step function, Unit impulse function. **INVERSE LAPLACE TRANSFORMS :** Definition, Convolution Theorem(without proof), Finding Inverse Laplace transform by convolution Theorem. Solution of Linear Differential equations using Laplace Transforms and Applications(5 Assignment Problem).	**10 HRS**
Module -2 Z- **TRANSFORMS:** Difference Equations ,Basic definitions, Damping rule, Shifting rule, Initial and Final Value theorems(without proof) and problems. Inverse Z-transforms. Applications of Z-transforms to solve difference equation(5 Assignment Problem).	**10 HRS**
Module -3 **STATISTICAL METHODS:** Correlation-karl Pearson's co-efficient of correlation problems. Regression analysis lines of regression (without proof)-problems. **CURVE FITTING:** Curve fitting by the method of least square. Fitting of the curves of the form $y = ax + b, y = ax^2 + bx + c$ & $y = ae^{bx}$. **Numerical Methods:** Numerical solution of algebraic and transcendental equations by Regula - Falsi Method and Newton-Raphson method. (5 Assignment Problem).	**10 HRS**
Module -4 **FINITE DIFFERENCE:** Forward and Backward differences, Newton's forward and backward interpolation formulae. Divided difference-Newton's divided difference formulae. Lagrange's-interpolation formula and inverse interpolation formula(all formula without proof) problems.	**10 HRS**

NUMERICAL INTEGRATION: Simpsons$(\frac{1}{3})^{rd}, (\frac{3}{8})^{th}$ rules, Weddle's rule (without proof) problems. (5 Assignment Problem).	
Module -5 **Probability Distribution:** Random variables(discrete and continuous) probability mass/density functions. Binomial distribution, Poisson distribution. Exponential and Normal distributions. Problems. (5 Assignment Problem).	**10 HRS**

Course outcomes: On completion of this course, students are able to:

- Know the use of Laplace transform and inverse Laplace transform in signal and image processing.
- Explain the general linear system theory for continuous time signals and digital signal processing using the Z-transform.
- Employ appropriate numerical methods to solve algebraic and transcendental equations.
- Apply Green's Theorem, Divergence Theorem and Stokes' theorem in various application in the field of electro-magnetic and gravitational fields and fluid flow problems.

Question paper pattern:

- The question paper will have ten questions.
- Each full Question consisting of 16 marks
- There will be 2 full questions (with a maximum of four sub questions) from each module.
- Each full question will have sub questions covering all the topics under a module.
- The students will have to answer 5 full questions, selecting one full question from each module.

Text Books:

1. B.S. Grewal: Higher Engineering Mathematics, Khanna Publishers, 43rd Ed., 2015.
2. E. Kreyszig: Advanced Engineering Mathematics, John Wiley & Sons,10th Ed., 2015.

Reference Books:

1. N.P.Bali and Manish Goyal: A Text Book of Engineering Mathematics, Laxmi Publishers , 7th Ed., 2010.
2. B.V.Ramana: "Higher Engineering Mathematics" Tata McGraw-Hill, 2006.
3. H. K. Dass and Er. Rajnish Verma: "Higher Engineering Mathematics", S. Chand publishing, 1st edition, 2011.

Web Link and Video Lectures:

1. *http://nptel.ac.in/courses.php?disciplineID=111*
2. *http://www.khanacademy.org/*
3. http://www.class-central.com/subject/math

TITLE OF THE COURSE: MECHANICS OF MATERIALS
B.E., III Semester, Civil Engineering
[As per Choice Based Credit System (CBCS) scheme]

Subject Code: 18 CV32	**CIE:** 50
Number of Lecture Hours/Week: 04	**SEE:** 50
Total Number of Lecture Hours: 50	**Exam Hours:** 03

CREDITS – 04

Course Objectives: This course will enable students;

1. To understand the basic concepts of the stresses and strains for different materials and strength of structural elements.
2. To know the development of internal forces and resistance mechanism for one dimensional and two dimensional structural elements.
3. To analyse and understand different internal forces and stresses induced due to representative loads on structural elements.
4. To analyse and understand principal stresses due to the combination of two dimensional stresses on an element and failure mechanisms in materials.
5. To evaluate the behavior of Bending stresses in beams, Thin & Thick Cylinder.

Modules	RBT LEVEL/ HRS
Module -1 **Centroids** Introduction to the concept, centroid of line and area, centroid of basic geometrical figures, computing centroid for– T, L, I, C, Z and full/quadrant circular sections and their built up sections. Numerical problems **Moment of Inertia** Introduction to the concept, Radius of gyration, Parallel axis theorem, Perpendicular axis theorem, Moment of Inertia of basic planar figures, computing moment of Inertia for – T, L, I,C, Z and full/quadrant circular sections and their built up sections. Numerical problems	**L1,L2,L4 10 HRS**
Module -2 **Simple Stresses and Strain:** Introduction, Definition and concept and of stress and strain. Hooke's law, Stress-Strain diagrams for ferrous and non-ferrous materials, factor of safety, Elongation of tapering bars of circular and rectangular cross sections, Elongation due to self weight. Saint Venant's principle, Compound bars, Temperature stresses, Compound section subjected to temperature stresses, Elastic constants and their relationship.	**L2,L3 10 HRS**

Module -3 **Compound Stresses:** Introduction, state of stress at a point, General two dimensional stress system, Principal stresses and principal planes. Mohr's circle of stresses **Torsion in Circular Shaft:** Introduction, pure torsion, Assumptions, derivation of torsion equation for circular shafts, torsional rigidity and polar modulus Power transmitted by a shaft, combined bending and torsion	**L2,L4** **10 HRS**
Module -4 **Shear Force and Bending Moment in Beams:** Introduction to types of beams, supports and loadings. Definition of bending moment and shear force, Sign conventions, relationship between load intensity, bending moment and shear force. Shear force and bending moment diagrams for statically determinate beams subjected to points load, uniformly distributed loads, uniformly varying loads, couple and their combinations	**L2,L4** **10 HRS**
Module -5 **Bending and Shear Stresses in Beams:** Introduction, pure bending theory, Assumptions, derivation of bending equation, modulus of rupture, section modulus, flexural rigidity. Expression for transverse shear stress in beams, Bending and shear stress distribution diagrams for circular, rectangular, 'I', and 'T' sections. Shear centre(only concept) L2,L4 **Thin And Thick Cylinder**: Introduction, thin cylinders subjected to internal pressure, Hoop stress ,longitudinal stress and change in volume, Thick cylinder subjected to both internal and external pressure, lames equation, Radial and hoop stress distribution, problems	**L2,L4** **10 HRS**

Course outcomes: After studying this course, students will be able;

1. To evaluate the strength of various structural elements internal forces such as compression, tension, shear, bending and torsion.
2. To suggest suitable material from among the available in the field of construction and manufacturing.
3. To evaluate the behavior and strength of structural elements under the action of compound stresses and thus understand failure concepts
4. To understand the basic concept of analysis and design of members subjected to torsion.
5. To understand the basic concept of analysis thin and thick cylinder.

Question paper pattern:

- The question paper will have ten questions.
- Each full question consists of 10 marks.
- There will be 2 full questions (with a maximum of four sub questions) from each module.
- Each full question will have sub questions covering all the topics under a module.

The students will have to answer 5 full questions, selecting one full question from each module.

TEXT BOOKS:

1. SS Bhavikatti" Strength of Materials",3rd Eddition ,Vikas Publishing House PVT LTD,2013
2. Bansal, "A Textbook of Strength of Materials", 4th Edition, Laxmi Publications, 2010

REFERENCE BOOKS:

1. D.H. Young, S.P. Timoshenko " Elements of Strength of Materials" East West Press Pvt. Ltd., 5th Edition (Reprint 2014)
2. S.S. Rattan " Strength of Materials" McGraw Hill Education (India) Pvt. Ltd., 2nd Edition (Sixth reprint 2013)
3. Vazirani, V N, Ratwani M M. and S K Duggal "Analysis of Structures Vol. I", 17th Edition, Khanna Publishers, New Delhi.
4. B.S. Basavarajaiah, P.Mahadevappa "Strength of Materials" in SI Units, University Press (India) Pvt. Ltd., 3rd Edition, 2010
5. Ferdinand P. Beer, E. Russell Johnston and Jr.John T. DeWolf "Mechanics of Materials", Tata McGraw-Hill, Third Edition, SI Units

TITLE OF THE COURSE: FLUIDS MECHANICS

B.E., III Semester, Civil Engineering

[As per Choice Based Credit System (CBCS) scheme]

Course Code: 18 CV33	**CIE Marks: 50**
Number of Lecture Hours/Week: 04	**SEE Marks: 50**
Total Number of Lecture Hours: 50 hours	**Exam Hours: 03**

Credits – 04

Course Objectives: The objectives of this course is to make students to learn:

1. The Fundamental properties of fluids and its applications.
2. Hydrostatic laws and application to practical problem solving
3. Principles of Kinematics and Hydro-Dynamics for practical applications
4. Basic design of pipes and pipe networks considering flow, pressure and its losses.
5. The basic flow rate measurements

Module-1 **Fluids & Their Properties:** Concept of fluid, Systems of units. Properties of fluid; Mass density, Specific weight, Specific gravity, Specific volume, Viscosity, Cohesion, Adhesion, Surface tension& Capillarity. Fluid as a continuum, Newton's law of viscosity (theory & problems).Capillary rise in a vertical tube and between two plane surfaces (theory & problems). Vapor pressure of liquid, capillarity, surface tension, pressure inside a water droplet, pressure inside a soap bubble and liquid jet. Numerical problems. **Fluid Pressure and Its Measurements:** Definition of pressure, Pressure at a point, Pascal's law, Variation of pressure with depth. Types of pressure. Measurement of pressure using simple, differential & inclined manometers (theory & problems).	**L2,L3 10HRS**

Module-2 **Hydrostatic forces on Surfaces:** Definition, Total pressure, centre of pressure, total pressure on horizontal, vertical and inclined plane surface, total pressure on curved surfaces. Numerical Problems. **Fundamentals of fluid flow (Kinematics):** Introduction. Methods of describing fluid motion. Velocity and Total acceleration of a fluid particle. Types of fluid flow, Description of flow pattern. Basic principles of fluid flow, three dimensional continuity equation in Cartesian coordinate system. Potential function, stream function, orthogonality of streamlines and equipotential lines. Numerical problems on Stream function and velocity potential.	**L2,L4** **10HRS**
Module-3 **Fluid Dynamics:** Introduction. Forces acting on fluid in motion. Euler's equation of motion along a streamline and Bernoulli's equation. Assumptions and limitations of Bernoulli's equation. Modified Bernoulli's equation. Problems on applications of Bernoulli's equation (with and without losses). problems Momentum equation **Applications:** Introduction. Venturimeter, Orificemeter, Pitot tube. Numerical Problems.	**L2,L4** **10HRS**
Module-4 **Orifice and Mouthpiece:** Introduction, classification, flow through orifice, hydraulic coefficients, Numerical problems. Mouthpiece, classification, Borda's Mouthpiece (No problems).L1,L2 **Notches and Weirs:** Introduction. Classification, discharge over rectangular, triangular, trapezoidal notches, Cippoletti notch, broad crested weirs. Numerical problems. Ventilation of weirs, submerged weirs.	**L2,L4** **10HRS**
Module-5 **Flow through Pipes:** Pipes in series, pipes in parallel, equivalent pipe-problems Pipe Networks, Hardy Cross method, Numerical problems. problems on pipe bends. **Losses in pipes:** Introduction. Major and minor losses in pipe flow. Darcy- Weisbach equation for head loss due to friction in a pipe. Minor losses in pipe flow, equation for head loss due to sudden expansion. Numerical problems. Design of Pipe Network-numerical problems.	**L2,L4** **10HRS**

Course outcomes: After successful completion of the course, the student will be able to:

1. Measurement of fluid pressure using manometers.
2. Compute and solve problems on hydrostatics, including practical applications
3. Apply principles of mathematics to represent kinematic concepts related to fluid flow
4. Apply fundamental laws of fluid mechanics and the Bernoulli's principle for practical applications
5. Compute the discharge through pipes and over notches and weirs.
6. Calculate the major and minor losses in pipe flow.

Text Books:

1. P N Modi and S M Seth, "Hydraulics and Fluid Mechanics, including Hydraulic Machines", 20th edition, 2015, Standard Book House, New Delhi
2. R.K. Bansal, "A Text book of Fluid Mechanics and Hydraulic Machines", Laxmi Publications, New Delhi
3. S K SOM and G Biswas, "Introduction to Fluid Mechanics and Fluid Machines", Tata McGraw Hill, New Delhi

Reference Books:

1. Victor L Streeter, Benjamin Wylie E and Keith W Bedford, "Fluid Mechanics", Tata McGraw Hill Publishing Co Ltd., New Delhi, 2008(Ed)
2. K Subramanya, "Fluid Mechanics and Hydraulic Machines", Tata McGraw Hill Publishing Co. Ltd.
3. K Subramanya, "Fluid Mechanics and Hydraulic Machines-problems and solutions", Tata McGraw Hill Publishing Co. Ltd.
4. J. F. Douglas, J. M. Gasoriek, John Swaffield, Lynne Jack, "Fluid Mechanics", Pearson, Fifth Edition.
5. Mohd.Kaleem Khan, "Fluid Mechanics and Machinery", Oxford University Press

TITLE OF THE COURSE: BASIC SURVEYING B.E., III Semester, Civil Engineering [As per Choice Based Credit System (CBCS) scheme]	
Course Code :18 CV34	**CIE Marks:50**
Number of Lecture Hours/Week- :04	**SEE Marks :50**
Total Number of Lecture Hours:50 Hours	**Exam Hours ;03**
Credits – 04	

Course Objectives: This course will enable students to;
1. Understand the basic principles of Surveying
2. Learn Linear and Angular measurements to arrive at solutions to basic surveying problems.
3. Employ conventional surveying data capturing techniques and process the data for computations.
4. Analyze the obtained spatial data to compute areas and volumes.
5. Draw contours to represent 3D data on plane figures.

MODULE	RBT LEVEL/ HRS
Module-1 **Introduction:** Definition of surveying, Objectives and importance of surveying. Classification of surveys. Principles of surveying. Units of measurements, Surveying measurements and errors, types of errors, precision and accuracy. Classification of maps, map scale, conventional symbols, topographic maps, map layout, Survey of India Map numbering systems. **Measurement of Horizontal Distances:** Different Instruments used for measurement**,** Measuring tape & chain and types, ranging of lines, direct and indirect methods of ranging, Electronic distance measurement. Field book and types, entries, Conventional symbols.	**L1,L2 10HRS**
Module-2 **Measurement of Directions and Angles: Compass survey:** Basic definitions;meridians, bearings, magnetic and True bearings. Prismatic and surveyor's compasses, temporary adjustments, declination. Quadrantal bearings, whole circle bearings, local attraction and related problems **Theodolite Survey and Instrument Adjustment:** Theodolite and types, Fundamental axes and parts of Transit theodolite, uses of theodolite, Temporary adjustments of transit theodolite, measurement of horizontal and vertical angles, step by step procedure for obtaining permanent adjustment of Transit theodolite	**L2,L3 10HRS**
Module-3 **Traversing:** Types of Traverse**,** Traverse Survey and Computations: Latitudes and departures,rectangular coordinates, Traverse adjustments, Bowditch rule and transit rule,Numerical Problems **Tacheometry:** basic principle, types of tacheometry, distance equation for horizontal and	**L1,L2 10HRS**

inclined line of sight in fixed hair method.	
Module-4 **Leveling:** Basic terms and definitions, Methods of leveling, Dumpy level, auto level, digital and laser levels. Curvature and refraction corrections. Booking and reduction of levels. Differential leveling, profile leveling, fly leveling, check leveling, reciprocal leveling, trigonometric leveling (heights and distances-single plane and double plane methods).	**L3,L4** **10HRS**
Module-5 **Curves:** Simple Curve-necessity-designation-Numericals, Compound Curve:Defination,elements and derivation. Transition curve: :Defination, elements and derivation. **Contouring:** Contours, Methods of contouring. **Total Station:**Defination, Parts,Uses,Advantages and disadvantages.	**L2,L3,L5** **10HRS**
Course outcomes: After a successful completion of the course, the student will be able to: 1. Posses a sound knowledge of fundamental principles Geodetics 2. Measurement of vertical and horizontal plane, linear and angular dimensions to arrive at solutions to basic surveying problems. 3. Capture geodetic data to process and perform analysis for survey problems] 4. Analyse the obtained spatial data and compute areas and volumes. 5. Represent 3D data on plane figures as contours	
Text Books: 1. B.C. Punmia, "Surveying Vol.1", Laxmi Publications pvt. Ltd., New Delhi – 2009. 2. Kanetkar T P and S V Kulkarni , Surveying and Leveling Part I, Pune Vidyarthi Griha Prakashan, 1988	
Reference Books: 1. S.K. Duggal, "Surveying Vol.1", Tata McGraw Hill Publishing Co. Ltd. New Delhi.2009. 2. K.R. Arora, "Surveying Vol. 1" Standard Book House, New Delhi. – 2010 3. R Subramanian, Surveying and Leveling, Second edition, Oxford University Press, New Delhi 4. A. Bannister, S. Raymond , R. Baker, "Surveying", Pearson, 7th ed., New Delhi	

TITLE OF THE COURSE: APPLIED ENGINEERING GEOLOGY LAB

B.E., III Semester, Civil Engineering

[As per Choice Based Credit System (CBCS) scheme]

Subject Code: 18CVL35	**CIE: 50**
Number of Lecture Hours/Week: 03	**SEE; 50**
Total Number of Lecture Hours: 40	**Exam Hours: 03**

CREDITS –01

Course Objectives: The objectives of this course is to enable students:

1. To identify the minerals and rocks based on their inherent properties and uses in civil engineering.
2. To interprete the geologiocal maps related to civil engineering project.
3. To learn the dip and strike , bore hole problem, thickness of geological formation related to foundation,tunnels, reservoirs and mining.
4. To understand subsurface geological condition through a geophysical technique and watershed management.
5. To visit civil engineering projects like dams, reservoirs, tunnels and quarry sites.

EXPERIMENTS

1.Physical properties of minerals: Identification of
i. Rock Forming minerals - Quartz group, Feldspar group, Garnet group, Mica group & Talc, Chlorite,Olivine, Asbestos, Calcite, Gypsum, etc
ii. Ore forming minerals- Magnetite, Hematite, Pyrite, Pyralusite, Graphite, Chromite, etc **L1,L2**

2.Engineering Properties of Rocks: Identification of
i. Igneous rocks- Types of Granites, Dolerite, Granite Porphyry, Basalt, Pumice etc
ii. Sedimentary rocks- Sandstone, Lime stone, Shale, Laterite, Breccia etc
iii. Metamorphic rocks- Gneiss, Slate, Schist, Marble, Quartzite etc **L2,L3**

3.Borehole problems: Determination of subsurface behavior of rocks, their attitude related to foundation,tunnels, reservoirs and mining. Triangular and Square methods. (2methods) **L3,L4,L5**

4.Dip and Strike problems. Determine Apparent dip and True dip. (2 methods) **L4**

5.Calculation of Vertical, True thickness and width of the outcrops. (3 methods) **L4,L5**

6.Study of Toposheets and Interpretation, Extraction of Drainage Basin and its Morphometric Analysis. (3Toposheets) **L5,L6**
7.Interpretation and drawing of sections for geological maps showing tilted beds, faults, unconformities etc. (10 Maps) **L3,L4**

Course outcomes: During this course, students will develop expertise in;

1. The students able to identify the minerals, rocks and utilize them effectively in civil engineering practices.
2. The students will interpret and understand the geological conditions of the area for implementation of civil engineering projects.

3. The students will interpret subsurface information such as thickness of soil, weathered zone, depth of hard rock and saturated zone by using geophysical methods.
4. The students will be able to identify the different structures in the field.

Question paper pattern:

1. All experiments are indidual experiments.
2. Instruction as printed on the cover page of answer script for split up of marks to be strictly fallowed.
3. All exercises are to be included for practical examination.

Reference Books:

1. MP Billings, Structural Geology, CBS Publishers and Distributors, New Delhi.
2. B.S. Satyanarayana Swamy, Engineering Geology Laboratory Manual, Dhanpat Rai Sons, New Delhi.
3. LRA Narayan, remote sensing and its applications, UniversityPress.
4. P.K.MUKERJEE, Textbook of Geology, WorldPress Pvt. Ltd., Kolkatta
5. JohnI Plattand John Challinor, Simple Geological Structures,ThomasMurthy&Co, London.

TITLE OF THE COURSE: Surveying Practice-I Lab
B.E., III Semester, Civil Engineering
[As per Choice Based Credit System (CBCS) scheme]

Course Code: 18CVL36	**CIE Marks :50**
Number of Lecture Hours/Week :03	**SEE Marks: 50**
Total Number of Hours: 40	**Exam Hours: 03**

Credits – 01

Course Objectives: The objectives of this course is to make students to:

1. Apply the basic principles of engineering surveying and measurements
2. Follow effectively field procedures required for a professional surveyor
3. Use techniques, skills and conventional surveying instruments necessary for engineering practice.

Experiments:

1. Measurements of distances using chain & tape by direct ranging. L3,L4
2. Setting out perpendiculars using cross staff, chain and tape. L3,L4
3. Setting out of geometrical figures using prismatic compass. L3
4. Measurement of bearings of sides of a closed traverse and adjustment of closing error by Bowditch method. L3
5. Determination of distance between two inaccessible points using compass and accessories. L4
6. Measurement of horizontal angle by repetation and reiterartion method. **L4**
7. Measurement of vertical angle by theodolite. L4
8. To determine reduced levels of points using dumpy level/auto level (simple leveling). L4
9. To determine reduced levels of points using dumpy level/auto level (differential leveling and inverted leveling). L4
10. To determine the difference in elevation between two points using Reciprocal leveling. L4
11. Demonstration on clinometers, Ceylon Gatt Trazer. L3

Course outcomes: After a successful completion of the course, the student will be able to:

1. Apply the basic principles of engineering surveying for linear and angular measurements.
2. Comprehend effectively field procedures required for a professional surveyor.
3. Use techniques, skills and conventional surveying instruments necessary for

engineering practice.

Question paper pattern:

- All are individual experiments.
- Instructions as printed on the cover page of answer script for split up of marks to be strictly followed.
- All exercises are to be included for practical examination.

Reference Books:

1. B.C. Punmia, **"Surveying Vol.1"**, Laxmi Publications pvt. Ltd., New Delhi 2009.
2. Kanetkar T P and S V Kulkarni , **Surveying and Levelling Part I**, Pune VidyarthiGrihaPrakashan, 1988
3. S.K. Duggal, **"Surveying Vol.1"**, Tata McGraw Hill Publishing Co. Ltd. New Delhi.-2009.
4. K.R. Arora, **"Surveying Vol. 1"** Standard Book House, New Delhi. – 2010 & Distributors

TITLE OF THE COURSE: Fluid Mechanics-I Lab

B.E., III Semester, Civil Engineering

[As per Choice Based Credit System (CBCS) scheme]

Course Code 18CVL37	**CIE Marks: 50**
Number of Lecture Hours/Week :03	**SEE Marks :50**
Total Number of Hours: 40	**Exam Hours: 03**

Credits – 01

Course Objectives: This course will enable students to;
1. Calibrate flow measuring devices.
2. Measure discharge and head losses in pipes.
3. Understand the fluid flow pattern.

Experiments:

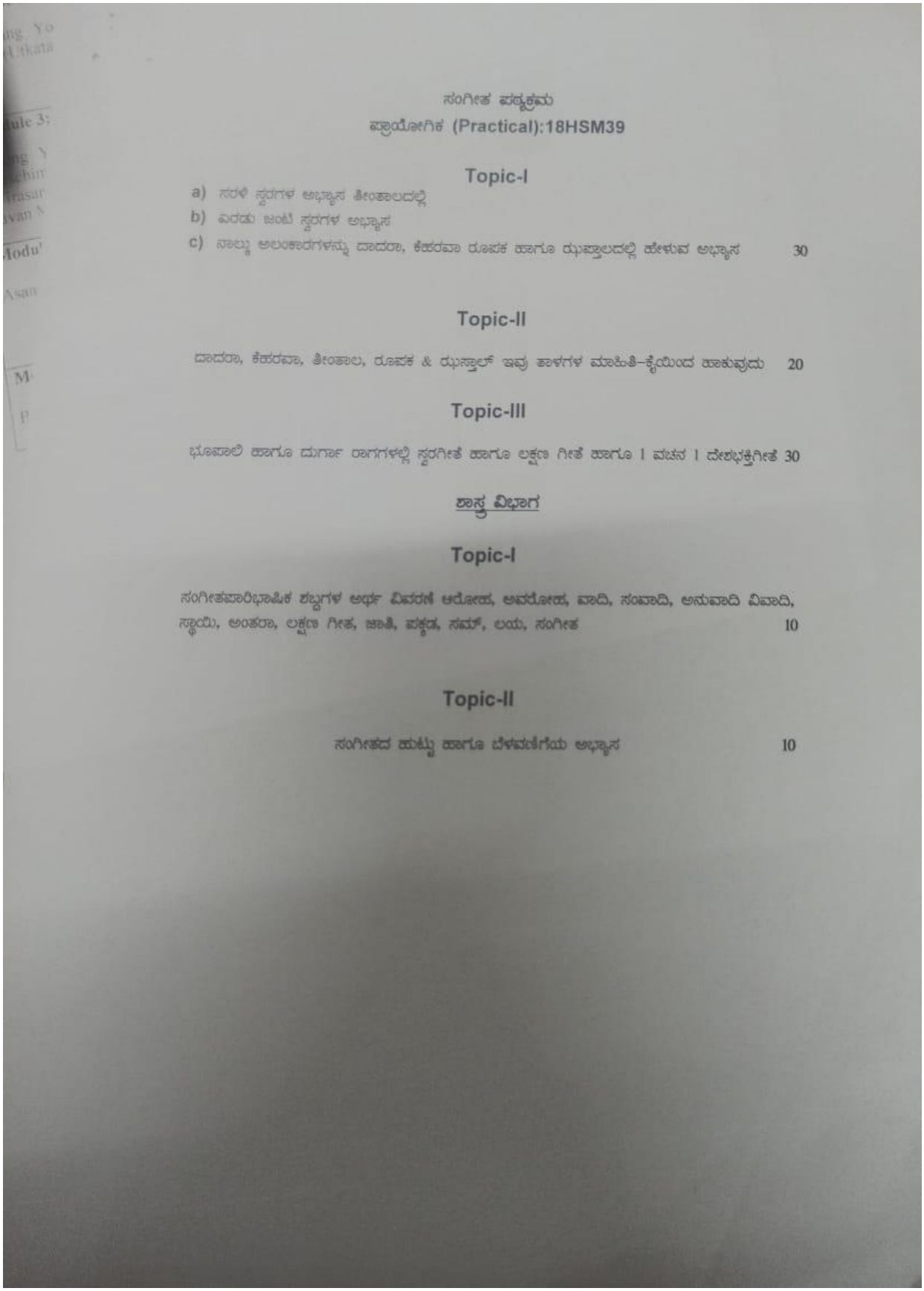
1.	Verification of Bernoulli's equation.	**L1,L2**
2.	Determination of Cd for Venturimeter and Orifice meter.	**L1,L2**
3.	Determination of hydraulic coefficients of small vertical orifice.	**L1,L2**
4.	Calibration of Rectangular , Triangular and Trapezoidal Notch.	**L1,L2**
5.	Calibration of Ogee and Broad crested weir.	**L1,L2**
6.	Determination of Cd for Venturiflume.	**L1,L2**
7.	Calibration of collecting tank.	**L1,L2**
8.	Determination of Major and Minor Losses in Pipes.	**L1,L2**

Course outcomes: During the course of study students will develop understanding of:
1. Properties of fluids and the use of various instruments for fluid flow measurement.
2. To calibrate various types of notches.
3. . To calibrate various types of Weirs.

Question paper pattern:
· All experiments are to be included in the examination except demonstration exercises.
· Candidate to perform experiment assigned to him
· Marks are to be allotted as per the split up of marks shown on the cover page of answer script

Reference Books:
1. Sarbjit Singh , *Experiments in Fluid Mechanics* - PHI Pvt. Ltd.- New Delhi
2. Mohd. Kaleem Khan, "Fluid Mechanics and Machinery", Oxford University Press
3. Hydraulics and Fluid Mechanics' – Dr. P.N. Modi & D r S.M. Seth, Standard Book House-New Delhi. 2009 Edition.

TITLE OF COURSE: YOGA (Common to all branches) SEMESTER-III [As per Choice Based Credit System (CBCS) scheme]	
Course Code : 18HSM 391	CIE Marks : 50
Contact Hours/Week : 02	SEE Marks: 50
Total Hours: 20	Exam Hours: 03
CREDIT:01	
Modules	
Module 1: Introduction to yoga .Warm-Up before yoga.Warm-up for Neck.Warm-up for Shoulders. Warm-up for Hands. Warm-up for Ankles. L1,L2,L3	
Module 2: Standing Yoga Poses:Mountain (Tadasana), Vrksasana (Tree Pose),Natarajasana (Dancer Pose),Chair Pose (Utkatasana), Half Wheel Pose (Ardha Chakrasana),Standing Forward Bend Pose (Uttanasana). L1,L2,L3	
Module 3: Sitting Yoga poses:Padmasana (Lotus Pose), Bound Angle Pose (Baddha Konasana),Forward Fold (Paschimottanasana),Boat Pose (Navasana),Head-to-Knee Forward Fold (Janu-Sirsasana),Hero Pose (Virasana),Vajrasana(Thunderbolt) ,Ustrasanat Camel pose), Asanas on back.Shavasana (Corps pose),Supta Pavan Muktasan. Tanasan ,Uttan apadasan ,Setu bandasan ,Sarvangasana ,Halasan , Chakrasana. L1,L2,L3	
Module 4: Asanas Lying on stomach :Shithilasan.Nabhi asana.Bhujangasana .Makrasana.Shalabhasana.Dhanurasna. L1,L2,L3	
Module 5: Pranayam :Kapalabhati, Anulom Vilom Pranayama, Bhramari Pranayama, Mediatation. L1,L2,L3	



ಸಂಗೀತ ಪಠ್ಯಕ್ರಮ

ಪ್ರಾಯೋಗಿಕ (Practical):18HSM39

Topic-I

a) ಸರಳ ಸ್ವರಗಳ ಅಭ್ಯಾಸ ತೀಂತಾಲದಲ್ಲಿ
b) ಎರಡು ಜಂಟಿ ಸ್ವರಗಳ ಅಭ್ಯಾಸ
c) ನಾಲ್ಕು ಅಲಂಕಾರಗಳನ್ನು ದಾದರಾ, ಕೆಹರವಾ ರೂಪಕ ಹಾಗೂ ಝಪ್ತಾಲದಲ್ಲಿ ಹೇಳುವ ಅಭ್ಯಾಸ 30

Topic-II

ದಾದರಾ, ಕೆಹರವಾ, ತೀಂತಾಲ, ರೂಪಕ & ಝಪ್ತಾಲ್ ಇವು ತಾಳಗಳ ಮಾಹಿತಿ-ಕೈಯಿಂದ ಹಾಕುವುದು 20

Topic-III

ಭೂಪಾಲಿ ಹಾಗೂ ದುರ್ಗಾ ರಾಗಗಳಲ್ಲಿ ಸ್ವರಗೀತೆ ಹಾಗೂ ಲಕ್ಷಣ ಗೀತೆ ಹಾಗೂ 1 ವಚನ 1 ದೇಶಭಕ್ತಿಗೀತೆ 30

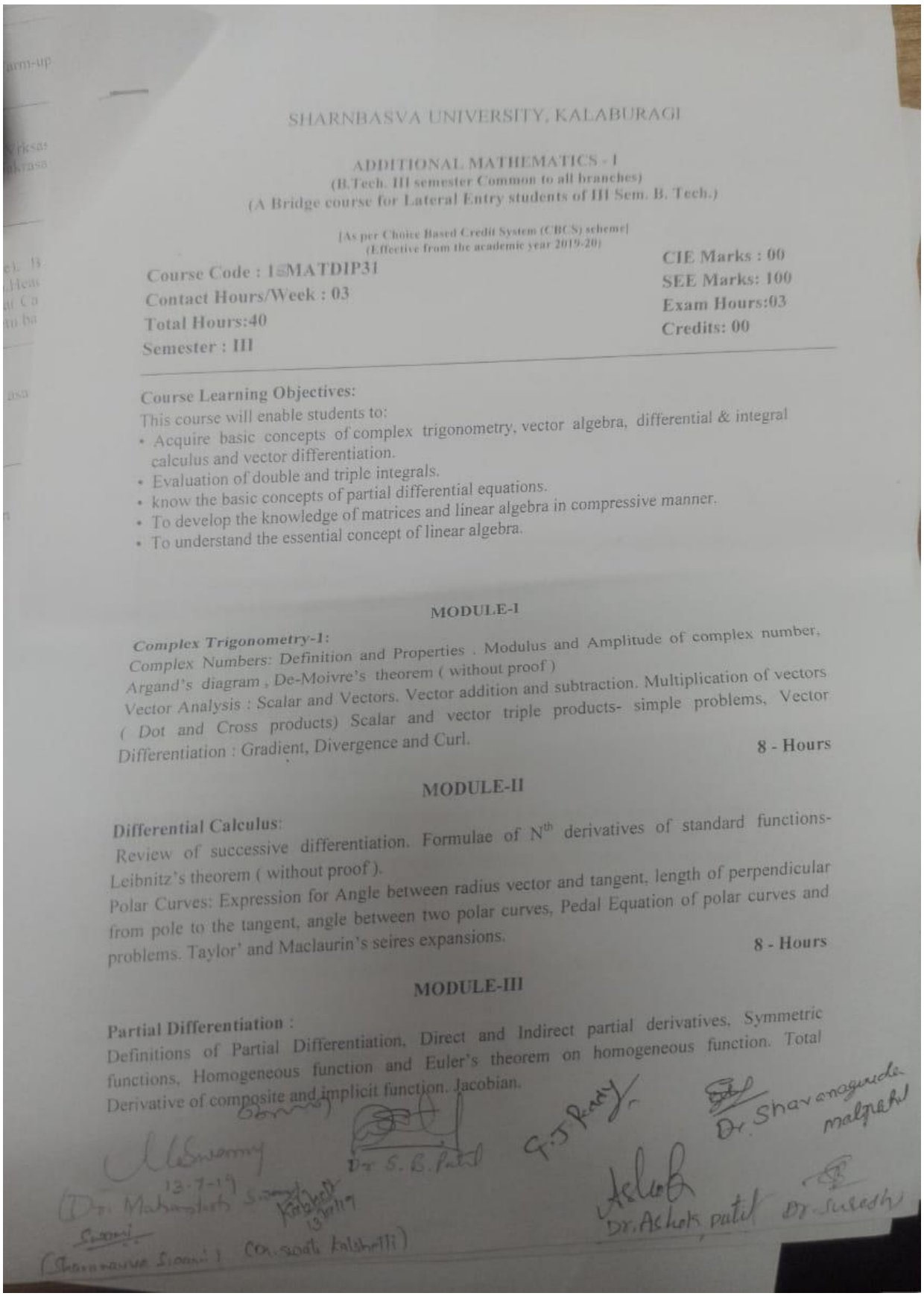
ಶಾಸ್ತ್ರ ವಿಭಾಗ

Topic-I

ಸಂಗೀತಪಾರಿಭಾಷಿಕ ಶಬ್ದಗಳ ಅರ್ಥ ವಿವರಣೆ ಆರೋಹ, ಅವರೋಹ, ವಾದಿ, ಸಂವಾದಿ, ಅನುವಾದಿ ವಿವಾದಿ, ಸ್ಥಾಯಿ, ಅಂತರಾ, ಲಕ್ಷಣ ಗೀತ, ಜಾತಿ, ಪಕ್ಕಡ, ಸಮ್, ಲಯ, ಸಂಗೀತ 10

Topic-II

ಸಂಗೀತದ ಹುಟ್ಟು ಹಾಗೂ ಬೆಳವಣಿಗೆಯ ಅಭ್ಯಾಸ 10



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ADDITIONAL MATHEMATICS - I
(B.Tech. III semester Common to all branches)
(A Bridge course for Lateral Entry students of III Sem. B. Tech.)

[As per Choice Based Credit System (CBCS) scheme]
(Effective from the academic year 2019-20)

Course Code : 18MATDIP31
Contact Hours/Week : 03
Total Hours:40
Semester : III

CIE Marks : 00
SEE Marks: 100
Exam Hours:03
Credits: 00

Course Learning Objectives:
This course will enable students to:
- Acquire basic concepts of complex trigonometry, vector algebra, differential & integral calculus and vector differentiation.
- Evaluation of double and triple integrals.
- know the basic concepts of partial differential equations.
- To develop the knowledge of matrices and linear algebra in compressive manner.
- To understand the essential concept of linear algebra.

MODULE-I

Complex Trigonometry-1:
Complex Numbers: Definition and Properties . Modulus and Amplitude of complex number, Argand's diagram , De-Moivre's theorem (without proof)
Vector Analysis : Scalar and Vectors. Vector addition and subtraction. Multiplication of vectors (Dot and Cross products) Scalar and vector triple products- simple problems, Vector Differentiation : Gradient, Divergence and Curl. **8 - Hours**

MODULE-II

Differential Calculus:
Review of successive differentiation. Formulae of N^{th} derivatives of standard functions- Leibnitz's theorem (without proof).
Polar Curves: Expression for Angle between radius vector and tangent, length of perpendicular from pole to the tangent, angle between two polar curves, Pedal Equation of polar curves and problems. Taylor' and Maclaurin's seires expansions. **8 - Hours**

MODULE-III

Partial Differentiation :
Definitions of Partial Differentiation, Direct and Indirect partial derivatives, Symmetric functions, Homogeneous function and Euler's theorem on homogeneous function. Total Derivative of composite and implicit function. Jacobian.

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MODULE-IV

8 - Hours

Integral Calculus

Reduction Formulae of $\int_0^{\pi/2} Sin^n x\,dx$, $\int_0^{\pi/2} Cos^n x\,dx$, and Statement of Reduction formulae $\int_0^{\pi/2} Sin^m x\,Cos^n x\,dx$ and Problems.

Double and Triple integral- simple problems.

MODULE-V

8 - Hours

Linear Algebra:

Basic concepts of matrices- Rank of matrix by elementary row transformations- Echelon form. Consistency of system of Linear equations. Solution of system linear equations by Gauss Elimination method. Linear Transformation, Cayley- Hamilton theorem to compute inverse of matrix. Eigen values and Eigen vector. Largest eigen values of eigen vectors by Reyleigh's Power method.

8 - Hours

Course outcomes:

On completion of the course, students are able to:

- Understand the fundamental concepts of complex numbers and vector algebra to analyze the problems arising in related area.
- Use derivatives and partial derivatives to calculate rates of change of multivariate functions.
- Learn techniques of integration including double and triple integrals to find area, volume, mass and moment of inertia of plane and solid region.
- Analyze position, velocity and acceleration in two or three dimensions using the calculus of vector valued functions.
- Recognize and solve first-order ordinary differential equations occurring in different branches of engineering.
- Solve systems of linear equations in the different areas of linear algebra.

Question paper pattern:

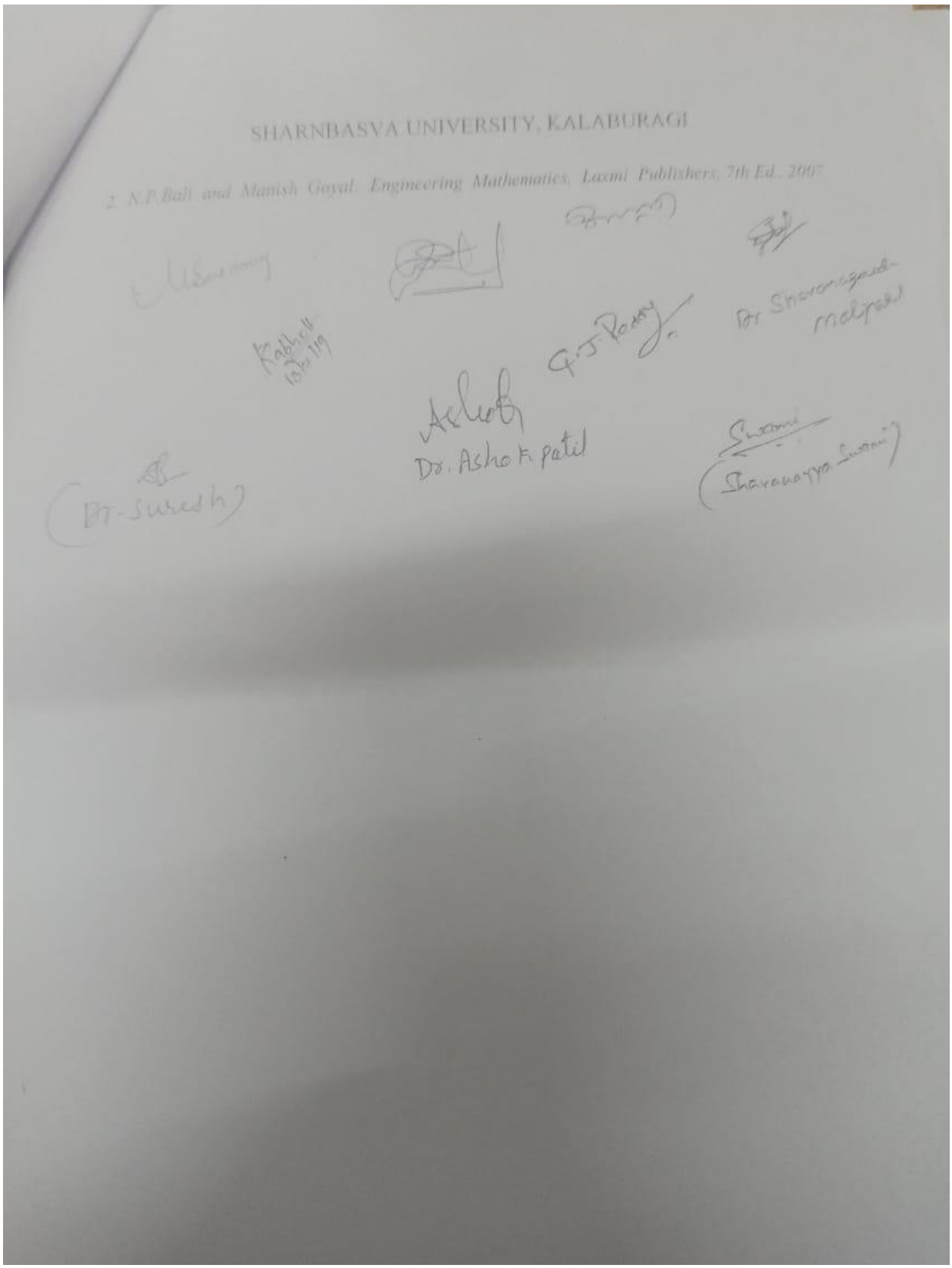
- The question paper will have ten questions.
- Each full Question consisting of 20 marks
- There will be 2 full questions (with a maximum of four sub questions) from each module.
- Each full question will have sub questions covering all the topics under a module.
- The students will have to answer 5 full questions, selecting one full question from each module.

Text Book:

B.S. Grewal: Higher Engineering Mathematics, Khanna Publishers, New Delhi, 43rd Ed., 2015.

Reference Books:

1. E. Kreyszig: Advanced Engineering Mathematics, John Wiley & Sons, 10th Ed., 2015.


SHARNBASVA UNIVERSITY, KALABURAGI
2. N.P.Bali and Manish Goyal: Engineering Mathematics, Laxmi Publishers, 7th Ed., 2007
Dr Sharanagoud-
Dr. Ashok K Patil
(Dr-Suresh)
(Sharanayya Swami)